

Work Order ID 59798

July 22, 2009 2:56:30 PM



Item ID: D212-664-207

Accept



Setup Start



Revision ID: A

Stop



Item Name: Crosstube Low Standard Aft

Start Date: 07/23/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 07/31/2009 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: *mf*

Date: 09-07-23 Tooling:

Date:

Run Start



QC:

Date:

SPC (Y/N):

Date:

Stop



Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Draw
Number

Draw
Rev.

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

Draw Nbr

Revision Nbr

D212-664-247

Rev A

0.00

100



DC

Document Control

DOCUMENT CONTROL

Memo

Photocopy bluefile and create labels as per RPP D212-664-207 CHG001

5 09/02/07

110



Packaging

Packaging

Packaging

Memo

0.00

0.00

9/8/1 30

120



CNC Bend 2

CNC Alpha 160 Bender

BENDING MACHINE - CROSSTUBES

Memo

Bend tube as per Dwg D212-664-247 using CNC bender program and Folio FT

0.00

0.00

W 9-7-23

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID 50798

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Page 2

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Date:

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Date:

Run Start

QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Draw
Number

Draw
Rev.

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

130

QC15- Crosstube Dimensional Check

0.00

⇒ S 9/7/03

⊕

⊕

QC

Memo

0.00

Quality Control

140

Crosstubes

0.00

Crosstubes

Memo

0.00

Crosstubes

1-Drill Rivet holes as per Dwg D212-664-247 using DT8972. 12-Drill pilot holes in tube as per Dwg D212-664-247 using DT8550 and DT8551. 13-Ream hole to finish size in tube as per Dwg D212-664-247. 14-Deburr & Inspect for surface damage. Repair damage within 1

- AWM 8-7-07

/DP 9-7-28

150

Crosstubes Chemical Conversion

0.00

HandFXtube

Memo

0.00

Hand Finishing Crosstubes

Chemical Conversion Coat Tube & Cuffs

i ⊕ - AWM 9-7-29

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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July 22, 2009 2:56:30 PM



Page 3

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Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start



QC:

Date:

SPC (Y/N):

Date:

Stop



Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Draw
Number

Draw
Rev.

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

160

QC3- Inspect Part Finish

0.00



QC

Memo

0.00

Quality Control

1 0 0908.04

170

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

Quality Control

1 0 0908.04

180

Outsource process - NDT per QSI038 4.1

0.00



Outsource2

Memo

0.00

Outsource process - NDT

Liquid Penetrant Inspection as per QSI 038 Issue P/O: 10169 LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order

CL 09/08/05 ①

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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NOTE: Date & initial all entries

Work Order ID 50798

Page 4

July 22, 2009 2:56:30 PM

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Cust Item ID:

Required Date: 07/31/2009 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan:

Date:

Tooling:

Date:

Stop



QC:

Date:

SPC (Y/N):

Date:

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run HoursDraw
NumberDraw
Rev.Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

190

0.00



Packaging

Packaging

Memo

0.00

Packaging

Ensure copy of NDT results attached to work order.

CY 09/08/05 ①

200

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

Quality Control

Inspect for damage & ensure results are as per Dwg D412-664-203

⇒ ml 09 08 05 ①

210

0.00



Crosstubes

Crosstubes

Memo

0.00

Crosstubes

1-Rivet Cuffs as per Dwg D212-664-247. with Sika flex in Between tube &
Cuff J A/R SIKAFLEX -241/-291 BATCH: 111557

⇒ ml 09 08 05 ①

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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QA: N/C Closed: _____ Date: _____

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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NOTE: Date & initial all entries

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July 22, 2009 2:56:30 PM



Page 5

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Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start



QC:

Date:

SPC (Y/N):

Date:

Stop



Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Draw
Number

Draw
Rev.

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

220

0.00



SprayPaint

SprayPaint

Memo

0.00

1-Prime inside and outside crosstube as per QSI 005 4.2 12-Paint outside
crosstube with White Imron as per QSI 005 4.2 ☐PRIME: ☐Start
Time: 10:00 ☐Finish Time: 11:00 ☐PAINT: ☐Start
Time: 3:00 ☐Finish Time: 4:00

⇒ ml 09 08 05 ①

230

0.00



QC

QC14- Inspect Spray Paint

Memo

0.00

Wrap in plastic bag to protect from scratches

⇒ 21 09-08-06

240

0.00



Crosstubes

Crosstubes

Memo

0.00

1- Assemble as per Dwg D212-664-247 12- Lightly scuff the bonded area using
a 320 grit sand paper and clean the area with 41058 wash 'n' wipe 13- Instal
support with magnobond 6398 per dwg D212-664-247, 14- Cure for 12hrs before
packaging. ☐Time & date of appli

⇒ ml 09 08 06 ①

09.08.06 / 145
13# 11/249
exp: 02/2010

Torgues ml 09 08 07 ①

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Work Order ID 50798

July 22, 2009 2:56:30 PM

Page 6

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Cust Item ID:

Required Date: 07/31/2009 Req'd Qty: 1.00

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start

QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run HoursDraw
NumberDraw
Rev.Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

250

QC5- Inspect part completeness to step on W/O

0.00

=> 8 08/02/07

ⓧ

ⓧ

QC

Memo

0.00

Quality Control

260

QC4- 100% Inspect kits for completeness

0.00

=> 8 08/02/07

ⓧ

ⓧ

QC

Memo

0.00

Quality Control

270

Packaging

0.00

Rev A

9/8/7 ⓧ 80

Packaging

Memo

0.00

Packaging

Identify and pack for shipping as per PPP D212-664-207

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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July 22, 2009 2:56:30 PM



Page 7

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Cust Item ID:

Required Date: 07/31/2009 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals:

Process Plan:

Date:

Tooling:

Date:

Stop



QC:

Date:

SPC (Y/N):

Date:

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Draw
Number

Draw
Rev.

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

280

QC21- Final Inspection - Work Order Release

0.00



QC

Memo

0.00

Quality Control

C209108107

07-08-09
09-08-07

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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QA: N/C Closed: _____ Date: _____

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

July 22, 2009 2:56:30 PM

Page 1/5

Work Order ID: 50798

Parent Item: D212-664-207RevA

Parent Item Name: Crosstube Low Standard Aft

Comments:

Start Date: 07/23/2009

Required Date: 07/31/2009

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
D3428-1RevA		Manufactured	No			100	Each	18.0000	1.0000			
Placard												

Warehouse
Location

Loc Qty

Loc Code

Main Warehouse

ST

18

47310

8

48359

10

47310

50

D212-664-207TRNRevA Manufactured No

140

Each

0.0000

1.0000

Crosstube Turning Detail

D3660-1RevB Manufactured No

220

Each

10.0000

2.0000

CUFF

Warehouse
Location

Loc Qty

Loc Code

Main Warehouse

ST

10

44455

4

46705

6

2-9-7-23 - AWM

300
P10

B50687

MB

09-07-30

✓

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

July 22, 2009 2:56:30 PM

Page 2/5

Work Order ID: 50798

Parent Item: D212-664-207RevA

Parent Item Name: Crosstube Low Standard Aft



Start Date: 07/23/2009

Required Date: 07/31/2009

Comments:

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
CR3212-4-06  CHERRY RIVET		Purchased	No			240	Each	346.0000	44.0000 			

Warehouse Loc Qty Loc Code
Location

Main Warehouse

ST

346

107534

346

D2940-1RevB

Manufactured

No

240

Each

74.0000

2.0000


mm. mm 09 08 05

Support

Warehouse Loc Qty Loc Code
Location

Main Warehouse

ST

74

24367

4

25594

2

41536

10

41870

20

45203

18

47748

20

mm. mm 09 08 06

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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July 22, 2009 2:56:30 PM

Page 3/5

Work Order ID: 50798

Parent Item: D212-664-207RevA

Parent Item Name: Crosstube Low Standard Aft


Start Date: 07/23/2009

Required Date: 07/31/2009

Comments:

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
D3595-063-530RevA		Manufactured	No			240	Each	162.0000	4.0000			
 RUBBER CUSHION												

Warehouse Loc Qty Loc Code

Location

Main Warehouse

ST 162
40780 2
44998 48
50030 112

1111 09.08.08

AN6-40A Purchased No

260 Each 31.0000 4.0000

Warehouse Loc Qty Loc Code

Location

Main Warehouse

ST 31
111424 31

111424 54

AN6-41A Purchased No

260 Each 67.0000 2.0000

Warehouse Loc Qty Loc Code

Location

Main Warehouse

ST 67
109371 17
111605 50

109371 54
9/8/1

July 22, 2009 2:56:30 PM

Shop Packet Print

Page 3

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Picklist Print

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Parent Item Name: Crosstube Low Standard Aft


Comments:

Start Date: 07/23/2009

Required Date: 07/31/2009

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
AN960JD616  Washer		Purchased	No			260	Each	398.0000	18.0000			

Warehouse Loc Qty Loc Code

Location

Main Warehouse

ST	398	
107242	3	
107959	6	
109371	8	
110704	23	
111193	18	
111607	340	

111607

SB

MS21042L6



Nut

Purchased

No

260

Each

779.0000

6.0000



Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

ST	779	
105077	22	
110002	257	
111548	100	
111578	400	

110002

9/8/11 SB

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
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July 22, 2009 2:56:30 PM

Page 5/5

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Parent Item: D212-664-207RevA

Parent Item Name: Crosstube Low Standard Aft

Comments:

Start Date: 07/23/2009

Required Date: 07/31/2009

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
MS21920-28		Purchased	No			260240	Each	150.0000	4.0000			



Clamp(per MIL-DTL-8783C)

(P10)

Warehouse Location	Loc Qty	Loc Code
OFFSHORE		
FG	5	
105884	5	
Main Warehouse		
ST	145	
106864	5	
108466	9	
108847	7	
109181	14	
109965	10	
111281	50	
111734	50	

ML 0806

July 22, 2009 2:56:30 PM

Shop Packet Print

Page 5

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	
09.08.07	260	The MS21920-28 @ Route 260 (kit picking) should be pulled @ Route. 240 per m change	EC	09.08.10		09.08.07	09.08.07	
09.08.07	100	D3428-1 placed @ Route 100 in pick kit + belongs to Route 260 per m change	EC	09.08.10		09.08.07	09.08.07	

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

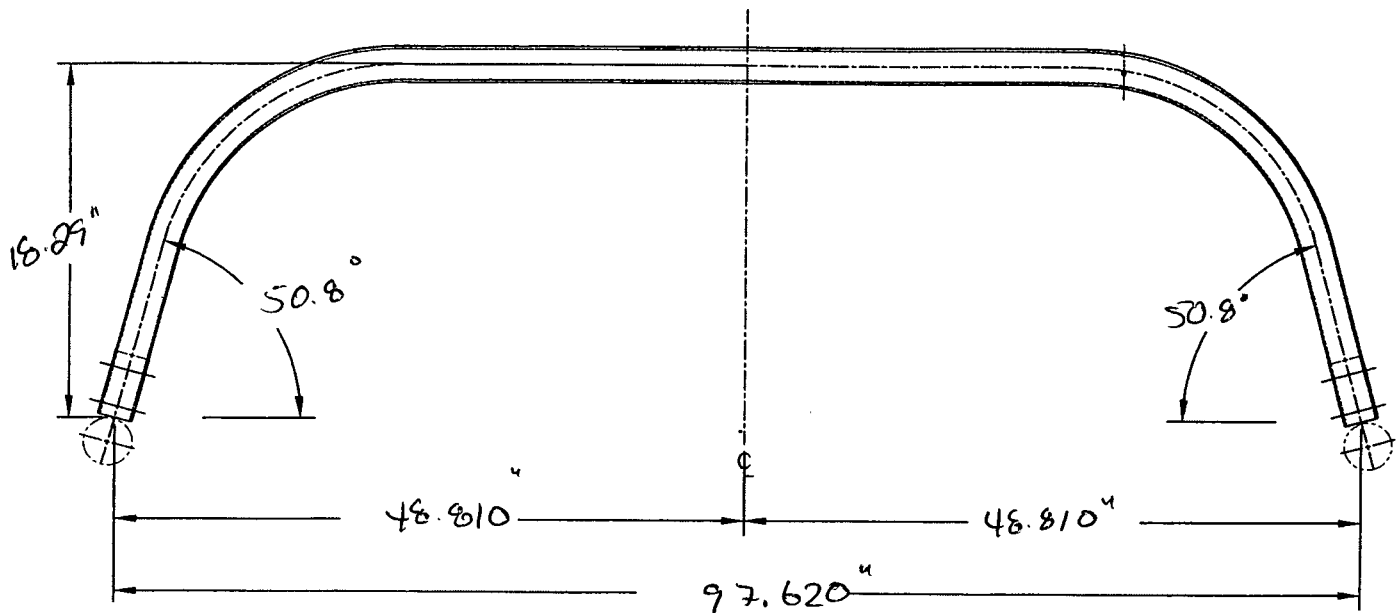
QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order:	50798
Description: Crosstube Low Aft (205/212)		Part Number:	D212-664-207
Inspection Dwg: D212-664-247 Rev: A		Page 1 of 1	

Required Dimension	Min	Max
Height	18.16	18.42
1/2 Span	48.55	48.81
Angle	49	52
Total Span	97.1	97.62



Comments

QC15 Inspection	8
Date	09/01/03

Rev	Date	Change	Revised by	Approved
A	08.02.29	New Issue	KJ/JM	

PARTS LIST:

Qty	Part Number	Description
X	D212-664-247	CROSSTUBE ASSEMBLY (205/212 LOW AFT)
1	D6008-132	CROSSTUBE
2	D2940-1	SUPPORT
4	D3595-063-530	RUBBER CUSHION
2	D3660-1	CUFF
4	MS21920-28	CLAMP (OR MS21920-30)
44	CR3212-4-06	RIVET (OR M7885/3-4-06)
A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
A/R	SIKAFLEX-241/-291	SEALANT (OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT)

GENERAL NOTES:

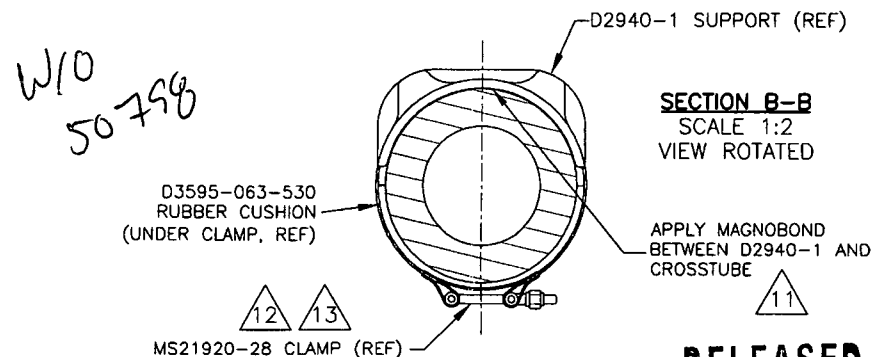
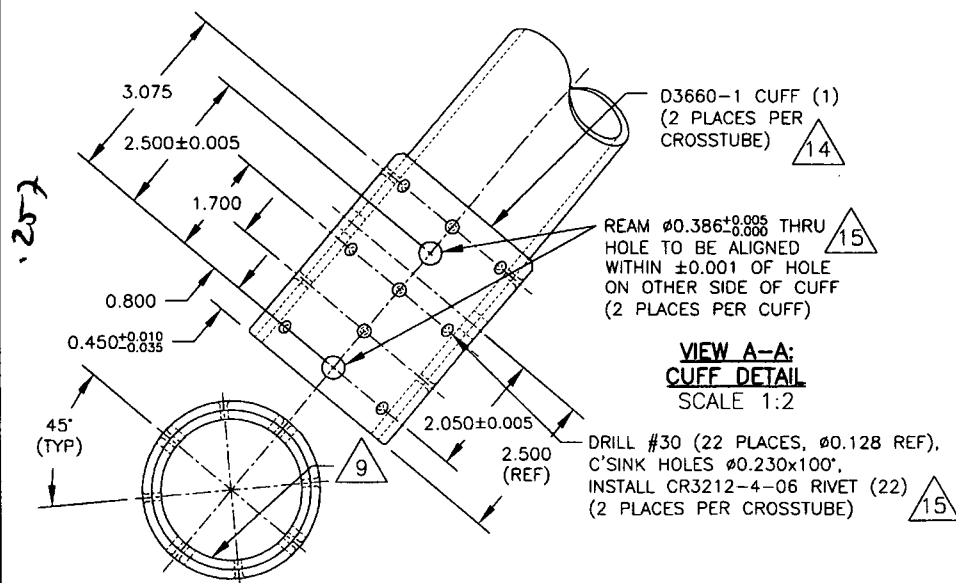
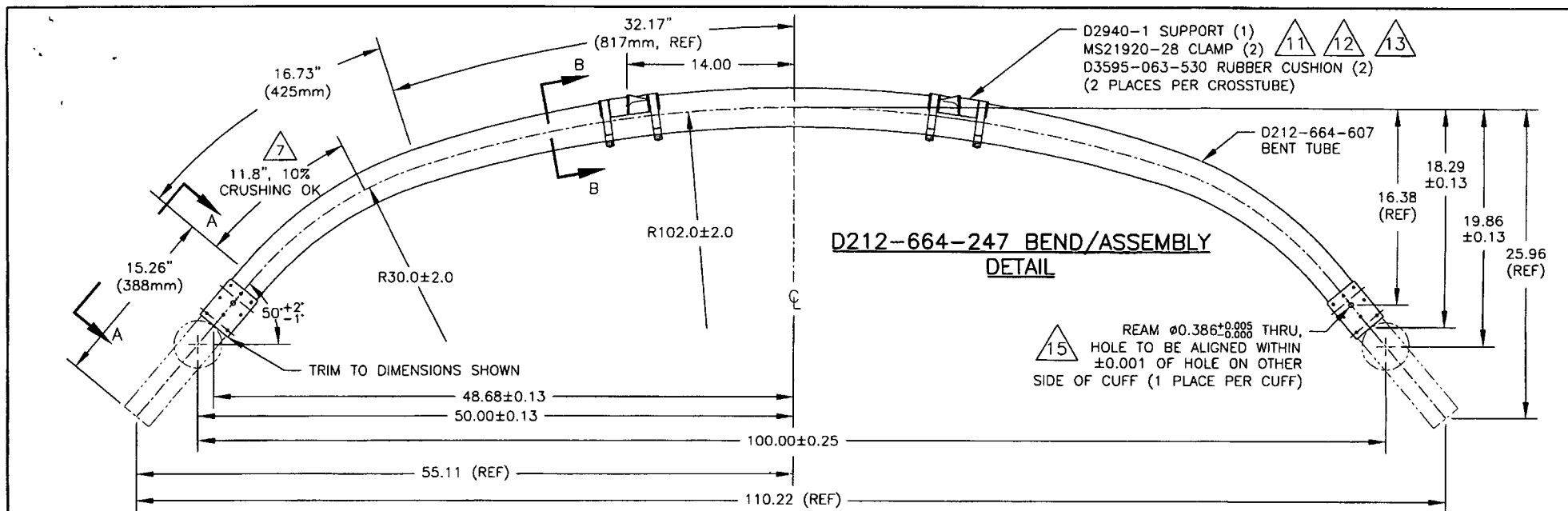
- 1) MATERIAL: MANUFACTURED FROM D6008-132
FINISHED LENGTH = 128.27 ± 0.020 (BEFORE BENDING/TRIMMING)
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) ALL DIMENSIONS ARE IN INCHES
- 5) PART IS SYMMETRIC ABOUT CENTERLINE.
- 6) WHEN MACHINING TAPER, RUN-OFF PART AT STOCK. BLEND OUT EDGE LONGITUDINALLY. TRANSITION SHOULD BE SMOOTH.
- 7) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D., EXCEPT UP TO 10% IS ALLOWED IN AREA NOTED.
- 8) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 9) SCRIBE DART PART NUMBER AND BATCH NUMBER ON INNER SURFACE OF TUBE WITH A VIBRATING STYLUS.
- 10) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 11) APPLY A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2940-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 12) INSTALL MS21920-28 CLAMPS (OR -30) WITH D3595-063-530 RUBBER CUSHIONS TO SECURE D2940-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE CROSSTUBE SUPPORT.
- 13) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.
- 14) INSTALL D3660-1 CUFF AFTER CHEMICAL CONVERSION COAT BUT BEFORE PAINT, WITH A LAYER OF SIKAFLEX-241/-291 OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT BETWEEN CUFF AND CROSSTUBE. SEAL EDGE OF CUFF TO ENSURE NO GAPS.
- 15) TOUCH-UP HOLES WITH CHEMICAL CONVERSION COAT.

50798
MR
09-07-28

DEO ATTACHED
RELEASED
07.07.07

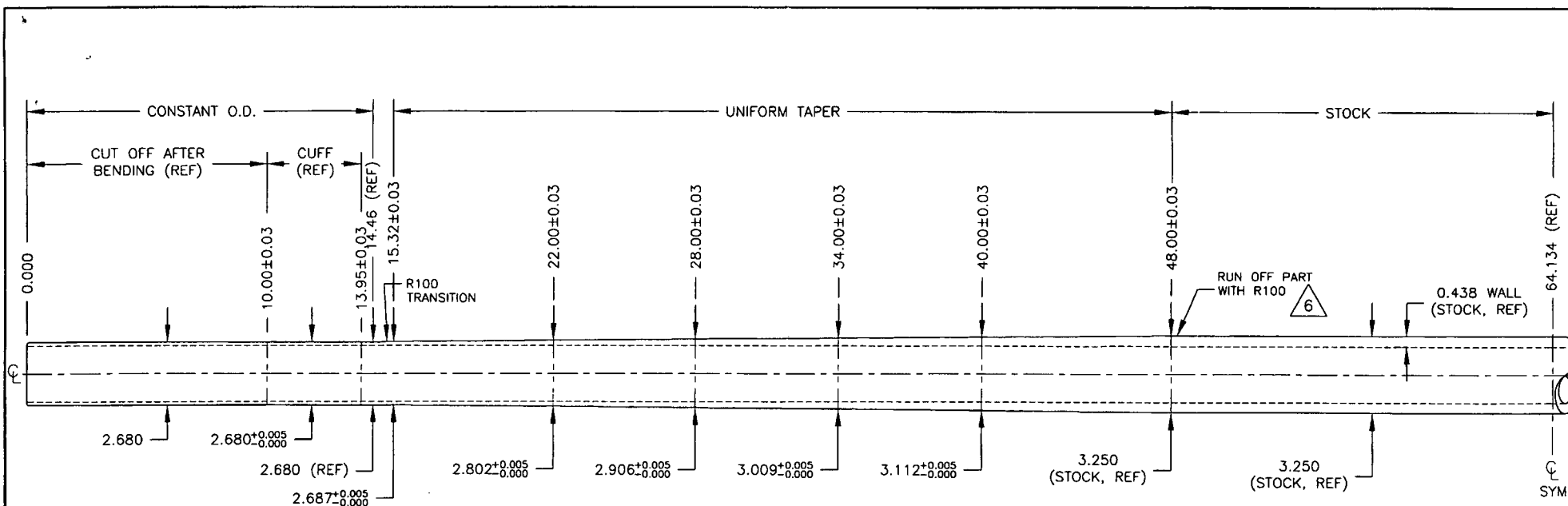
A		07.07.07	NEW ISSUE
DESIGN <i>qp</i>		DRAWN BY <i>qp</i>	DART DART AEROSPACE LTD. WARRICKSBURY, ONTARIO, CANADA
CHECKED <i>ph</i>		APPROVED <i>ph</i>	DRAWING NO. D212-664-247 REV. A SHEET 1 OF 3
DATE 07.07.07		TITLE CROSSTUBE (205/212 LOW AFT) SCALE NTS	

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		DATE 07.07.07	TITLE CROSSTUBE (205/212 LOW AFT)		SCALE 1:8



D212-664-247 MACHINING DETAIL

W/D 50790

RELEASED
07.09.24
DEO ATTACHED

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		DATE 07.07.07	TITLE CROSSTUBE (205/212 LOW AFT)		SCALE 1:4

DRAWING NO. D212-664-247	TITLE CROSSTUBE	REV. A	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D212-664-247-A-1	SHEET NO. SHEET 1 OF 1	SCALE NTS
DRAWN <i>UP</i>	CHECKED <i>PR</i>	MFG. APPR. <i>AA</i>	APPROVED <i>AMP</i>		DE APPR. <i>#</i>		
DATE 09.05.01	DATE 09.06.15	DATE 09/06/22	DATE 09/06/22		DATE 09.06.22		

CHANGE:

ADD THE FOLLOWING CROSSTUBE ASSEMBLY:

Part Number	Description
D212-664-247B	CROSSTUBE ASSEMBLY (214 LOW AFT)

THE D212-664-247B CROSSTUBE HAS THE SAME PARTS LIST AS THE D212-664-247 CROSSTUBE. HOWEVER, INSTALL THE SUPPORTS AS SHOWN IN FIGURE 1 OF THIS ENGINEERING ORDER. THE NEW KIT IS OTHERWISE ASSEMBLED PER THE D212-664-247 CROSSTUBE.

RELEASED
09/06/22

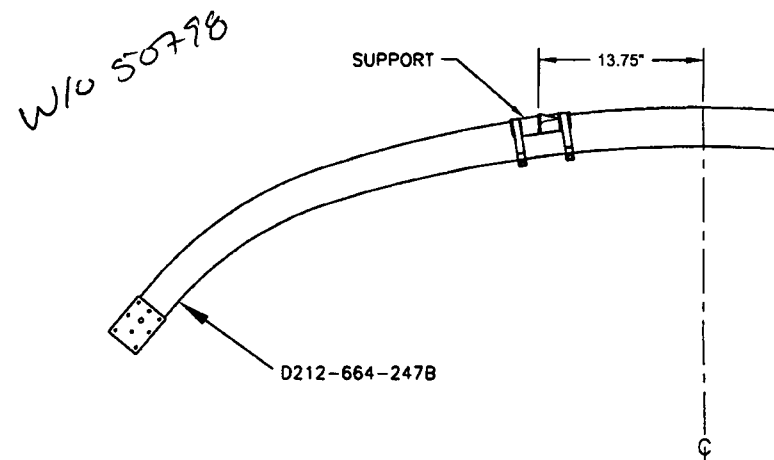


FIGURE 1 - SUPPORT INSTALLATION

Jason Murdoch

From: David Shepherd [dshepherd@dartaero.com]
Sent: July 28, 2009 6:25 PM
To: 'Mike Petsche'
Cc: 'Eric Charbonneau'; 'Bill Beckett'; 'Jean-Luc Menard'; 'Jason Murdoch'; 'L Lacelle'; ssheldon@dartaero.com
Subject: RE: low crosstubes
Attachments: 20090728154900265.pdf; cuff 002.jpg; Drawing-July 27-09.pdf

Mike,

Sorry for not getting back to you right away on this. Eric has provided me with some interesting measurements and photographs in the last couple of days.

Based on the attached modified analysis, it is acceptable to grind down the crosstubes to a minimum wall thickness of 0.120" so that the existing cuffs will fit. The cuff is already 0.010" to 0.020" bigger than the end of the crosstube, so I would prefer not to enlarge the cuff parts as this will just increase the gaps in the inboard/outboard directions. See attached. I am OK with your proposal to update the IPP/estimate/routing with a statement like "Grind ends of crosstube to min wall thickness of 0.120" so that cuffs will fit" rather than updating the drawing. I am hoping that this is only a temporary solution.

Ultimately, at the risk of stating the obvious, we need to find a way to keep the cuffs rounder off the bender. My understanding is that this problem is exaggerated on the newer bender because the shafts are bigger and there is more crosstube stuffed in the bender. Could we go back to bending these on the old bender on the narrowest possible setting? Or at least finish them on the old bender? My guess is that this problem will be even worse when we try to bend the 412CF crosstubes, yet we delivered 16 sets of 412CF low narrow gear to Canadian that I believe were bent on the old machine?

As I said this morning, I would be prepared to work with Dan on his bending programs when I am there in mid August. I know these are tricky to bend, but it sounds to me like his bend is travelling into the cuff more than it should be.

Bill/Susanne,

I'm a little concerned that we would bend and grind 0.030" of material off 5 tubes before it was reported that this was a problem, but I don't know the full story.

David

From: Mike Petsche [mailto:mpetsche@dartaero.com]
Sent: Tuesday, July 28, 2009 8:47 AM
To: 'David Shepherd'
Cc: 'Bill Beckett'; echarbonneau@dartaero.com; 'Jean-Luc Menard'; 'Jason Murdoch'
Subject: low crosstubes

David,

As I'm getting back up to speed here, it would seem that grinding the ends of the crosstubes at least for now, seems to be the best option to make the sleeves fit.

Eric has said that you are comfortable with the amount being removed. So that being the case, we need an excuse me note for them to continue doing what they are doing. (which needs to come from

29/07/2009

Chris or you).

I think we COULD get away with just adding this to the IPP....otherwise we could do a DEO to the crosstube dwg...

Mike Petsche

Design Manager

DART Aerospace

phone: 613-632-5200

mobile: 514-833-1657

skype: mike.petsche

No virus found in this incoming message.

Checked by AVG - www.avg.com

Version: 8.5.392 / Virus Database: 270.13.34/2268 - Release Date: 07/28/09 06:00:00

29/07/2009



LIQUID PENETRANT TEST REPORT

P. 14944

CLIENT	<u>DART AEROSPACE</u>	DATE	<u>AUG 4-2009</u>	PAGE	<u>1</u> OF <u>1</u>
ATTENTION	<u>LINDA / CHANTEL</u>	ACUREN JOB NO.	<u>188-09-001480</u>	TIME	AM <input checked="" type="checkbox"/> PM <input type="checkbox"/>
ADDRESS	<u>1270 ABERDEEN ST</u>	PO/VO NO.	<u>10169</u>		
	<u>HAWKESBURY ON.</u>	WORK LOCATION	<u>HAWKESBURY</u>		
	<u>KGH 1K7</u>	ACCEPTANCE STD.	<u>ASTM 1417</u>	REV./DATE	<u>2007</u>
PROJECT	<u>F.P.I. ON MACHINED PARTS AND CROSS TUBES</u>				
ITEM(S) EXAMINED					

JOB DESCRIPTION	PROCEDURE NO. <u>LT0002</u>	REV./DATE	TECHNIQUE NO. <u>LT-1417</u>	REV./DATE
PART NO.	MATERIAL <u>S.S. / ALUMINUM</u> THICKNESS <u>—</u>			
SCOPE	<u>WET FLUORESCENT LIQUID PENETRANT INSPECTION</u> <u>CARRIED OUT 100% EXTERNAL</u>			

TEST DETAILS	
METHOD <input checked="" type="checkbox"/> FLUORESCENT <input type="checkbox"/> VISIBLE	<input type="checkbox"/> WATER WASH <input type="checkbox"/> SOLVENT REMOVABLE <input type="checkbox"/> POST EMULSIFIED
FAMILY BRAND <u>MAGNAFLUX</u>	BLACK LIGHT S/N <u>16459</u> <input type="checkbox"/> OUTPUT > 1000 μ W/cm ² <input type="checkbox"/> AMBIENT < 2 fc
PENETRANT <u>2L 67</u> MINIMUM DWELL TIME <u>45</u> MIN.	LIGHTING EQUIP. <input type="checkbox"/> FLASHLIGHT <input type="checkbox"/> TROUBLELIGHT <input type="checkbox"/> OUTPUT > 100 fc @ SURFACE
PENETRANT REMOVER <u>H2O</u> MINIMUM DRY TIME <u>>10</u> MIN.	OTHER <u>LABING</u>
DEVELOPER <u>SKD 52</u> MINIMUM DWELL TIME <u>10</u> MIN.	LIGHT METER S/N <u>—</u> CAL DUE DATE <u>DEC. 8-2009</u>
DEVELOPER TYPE <input checked="" type="checkbox"/> NON AQUEOUS <input type="checkbox"/> AQUEOUS <input type="checkbox"/> DRY	

TEST SURFACE	
SURFACE CONDITION <input type="checkbox"/> AS GROUND <input checked="" type="checkbox"/> AS WELDED <input type="checkbox"/> MACHINED <input type="checkbox"/> SHOT BLASTED <input checked="" type="checkbox"/> CLEAN BARE METAL	
SURFACE TEMPERATURE <input type="checkbox"/> < - 4°C/ 20°F <input type="checkbox"/> - 4°C/ 20°F TO 10°C/ 50°F <input type="checkbox"/> 10°C/ 50°F TO 52°C/ 125°F <input type="checkbox"/> > 52°C/ 125°F	

RESULTS- (<input type="checkbox"/> METRIC <input type="checkbox"/> IMPERIAL)																															
<table border="0"><tr><td>W.O. 50388</td><td></td><td></td></tr><tr><td>40 MACHINED PARTS</td><td>✓</td><td></td></tr><tr><td>W.O. 50965</td><td></td><td></td></tr><tr><td>10 PCS</td><td></td><td></td></tr><tr><td>W.O. 50966</td><td></td><td></td></tr><tr><td>10 PCS</td><td>✓</td><td></td></tr><tr><td>W.O. - 50796 - 1 PC</td><td>✓</td><td></td></tr><tr><td>W.O. - 50798 - 1 PC</td><td>✓</td><td></td></tr><tr><td>W.O. - 50797 - 1 PC</td><td>✓</td><td></td></tr><tr><td>W.O. - 50667 - 1 PC</td><td>✓</td><td></td></tr></table>	W.O. 50388			40 MACHINED PARTS	✓		W.O. 50965			10 PCS			W.O. 50966			10 PCS	✓		W.O. - 50796 - 1 PC	✓		W.O. - 50798 - 1 PC	✓		W.O. - 50797 - 1 PC	✓		W.O. - 50667 - 1 PC	✓		<p>ALL ITEMS INSPECTED WERE FOUND ACCEPTABLE</p> <p><i>[Signature]</i> 09 08 05</p>
W.O. 50388																															
40 MACHINED PARTS	✓																														
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W.O. - 50798 - 1 PC	✓																														
W.O. - 50797 - 1 PC	✓																														
W.O. - 50667 - 1 PC	✓																														

Scope of Services
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES		
CLIENT REPRESENTATIVE <u>MATTHEW MURDOCH</u>	<u>[Signature]</u>	DTR # <u>E-20066</u>
TECHNICIAN (SIGNATURE): <u>Mike Johnston</u>	<u>[Signature]</u>	REPORT REVIEWED BY:
NAME (PRINT): <u>[Signature]</u>		NAME INITIALS
CGSB LEVEL <u>II</u> SNT LEVEL <u>—</u>	CGSB LEVEL <u>—</u> SNT LEVEL <u>—</u>	
CGSB REG. NO. <u>6066</u>	CGSB REG. NO. <u>—</u>	